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AUTHOR Rousseau, Marilyn K.; Poulson, Claire L.
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ABSTRACT

Three academically deficient and behavior disordered male students, 9 to 13 years of age, participated in a treatment program to improve their written composition skills. A multiple-baseline across-subjects design was used to analyze the effects of three treatment procedures on the number and variety of adjectives per T-unit (minimal terminable unit) written by the students. Treatment 1 was simple instructions, descriptive praise, and points for use of adjectives; Treatment 2 added sentence-combining instructional materials; and Treatment 3 added descriptive praise and points for use of different adjectives. Treatment 1 alone was sufficient to systematically increase the number and variety of adjectives per T-unit. Furthermore, the mean number of all words per T-unit increased by 4 to 5 grade levels for two students, bringing them above grade level. Evaluations of story quality showed marked improvement for all three students. (21 references) (Author/DB)

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Using Sentence-Combining to Teach the Use of Adjectives in Writing to Severely Behaviorally Disordered Students

Marilyn K. Rousseau
The City College/City University of New York
Claire L. Poulson
Queens College/City University of New York

Appreciation is expressed to Dr. Brian Bottge for preparation of the sentence-combining exercises.

Running head: SENTENCE-COMBINING/ADJECTIVES

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Abstract

Three academically deficient students 9 to 13 years of age participated in a treatment program to improve their written composition skills. The study took place in a special resource room of a school for behaviorally-disordered students. A multiple-baseline across-subjects design was used to analyze the effects of three treatment procedures on the number and variety of adjectives per T-unit (minimal terminable unit) written by the students. Treatment 1 was simple instructions, descriptive praise, and points for use of adjectives; Treatment 2 added sentence-combining instructional materials; and Treatment 3 added descriptive praise and points for use of different adjectives. Treatment 1 alone was sufficient to systematically increase the number and variety of adjectives per T-unit. Furthermore, the mean number of all words per T-unit increased by 4 to 5 grade levels for two students, bringing them above grade level. Evaluations of story quality showed marked improvement for all three students.

Using Sentence-Combining to Teach Adjectives in Writing to Severely Behaviorally Disordered Students

Marilyn K. Rousseau

The City College of the City University of New York

Claire L. Poulson

Queens College of the City University of New York

Most research comparing mildly handicapped writers to their nonhandicapped peers has focused on children considered either learning-disabled (Bain, 1976; Poplin, Gray, Larsen, Banikowski,& Mehring, 1980; Wiig & Semel, 1980) or low achieving (Moran, 1981). On the subject of teaching written composition skills, only four published experimental studies to date have been undertaken with normally hearing, handicapped students who are academically deficient, learning disabled, and/or behaviorally disordered (Bording, McLaughlin, & Williams, 1984; Brigham, Graubard, & Stan, 1972; Harris & Graham, 1985; Kraetsch, 1981). Bording et al. (1984) studied the effects of a free-time contingency and teacher instructions on capitalization and punctuation skills used in journal writing by nine mildly handicapped children ages 12-16 years. In a multiple-baseline design across pairs of subjects, they found that capitalization and punctuation improved as a result of treatment. Subjective evaluators' ratings showed that quality of writing increased during treatment.

Brigham et al. (1972) examined the effects of a token (point) system on the number and variety of words used in stories written by three groups of fifth-graders in an "adjustment" class who showed academic deficits of at least two years. In a multiple-baseline

across-groups design, they found that both number and variety of words written increased. Subjective evaluators' ratings showed that quality of story-writing also increased.

Harris and Graham (1985) examined the effects of a self-control strategy on increasing the mean number of words per story and the number of "action words, action helpers, and describing words" in stories written by two learning disabled twelve-year-olds in an unused classroom. In a multiple-baseline across responses, nested within a multiple-baseline across subjects design, they found that the self-control strategy was effective in increasing all measures above baseline levels. The authors reported that story quality was rated higher by evaluators after treatment than before.

Kraetsch (1981) studied the effects of oral instructions on number and variety of words and sentence variety in stories written by a learning disabled 12-year-old in a university tutorial clinic. Using a reversal design, the author reported that treatment increased both number and variety of words, but not sentence variety. No measures of story quality were included.

In the present study we analyzed the effectiveness of simple instructions, descriptive praise, and a point system alone and in combination with sentence-combining exercises (O'Hare, 1973) in increasing the number and the variety of adjectives per T-unit written by handicapped students. Tokens were used because descriptive praise, when informally observed, did not appear to be sufficient to influence the behavior of these students. Furthermore, we examined their

stories for increased number of words per T-unit and for increased story quality, as measured by subjective evaluations.

Method

Subjects and Setting

Three academically deficient boys assigned to a self-contained public day school for severely behaviorally-disordered students participated. Their behavior disorders included noncompliance with instructions, refusal to participate in class activities, inappropriate emotional outbursts, and destruction of school property. They attended a non-graded classroom with five other boys, a teacher, and a teacher's aide. Both tutoring and story-writing took place in a special resource room at the school.

Participants, Chad (age 12, IQ 82), Andy (Age 9, IQ 90), and Joe (age 13, IQ 84), were those students who (a) used the lowest mean number of words per T-unit (7.80, 6.80, and 5.90, respectively); and (b) used few adjectives in four 20-minute writing samples obtained before the beginning of the study. Chad, Andy, and Joe showed mean deficits of 1.14, 1.22, and 4.47 words per T-unit, respectively, when compared to their nonhandicapped grade level peers (Loban, 1976). According to these data, Chad, Andy, and Joe were performing below grade level by approximately 3, 1, and 5 grades, respectively.

Materials

Punctuation and capitalization exercises contained ten to fifteen phrases or sentences that the students were instructed to rewrite or change using correct punctuation or capitalization. The commerically-available exercises covered punctuation of interrogative, declarative,

and exclamatory sentences, and capitalization of proper nouns and first words in sentences.

Sentence combining exercises consisted of 10 sets of two or three simple sentences that were to be combined into one sentence. The exercises changed in degree of complexity throughout the study from one adjective preceeding the subject of the sentence or preceeding a noun in the predicate (Cooper, 1973). For example, the sentences The boy was hungry, and The boy was little. can be combined into The little boy was hungry. The vocabulary level was restricted to words on the Dale-Chall List (1948), which represents the reading vocabulary of 80% of fourth-grade children. The sentence-combining exercises were written by graduate students and the first author.

Color and black and white commerically available 8 x 10 in. (20.32 x 25.40 cm) or 12 x 17 in. (30.48 x 43.18 cm) photographs provided topics for students during story writing. The photographs depicted scenes such as a child hugging an adult or children playing basketball. A total of 112 different pictures were used in the tutoring periods.

Procedure

Point System. During all sessions the student earned descriptive praise and points for correct target responses and cooperation. He could earn a total of 10 points for cooperation, 5 points for scoring 80% correct on exercises, and 1 point for each target response. For example, following the story-writing period during Treatment, the experimenter circled each adjective on the student's paper, praised him and told him the number of target responses, and thus, the number

of points he earned during the period. Points could be exchanged for daily and weekly reinforcers. The student was required to earn 18 points to receive a daily reinforcer (inexpensive trinkets such as balloons) and 64 points to receive a weekly reinforcer (more costly items such as toy cars).

Cooperation during all sessions was reinforced to prevent unnecessary disruptions by the student. Cooperation was defined as the student's: (a) walking quietly and directly to the tutoring room, (b) preparing to work within 15 seconds of entering the room, and (c) responding appropriately to the researcher's instructions.

Dependent Measures. A T-unit was defined as an independent clause (e.g., "The man ate a steak") including subordinate clauses attached to or embedded in it (e.g., The man ate a steak whenever he was hungry) (Hunt, 1970). Two independent clauses joined by a conjunction (e.g., The man ate a steak and he drove home") comprised two T-units, with the conjunction attached to the second T-unit.

An adjective was defined as a word describing or modifying a noun and limiting its meaning. Included were predicate adjectives, nouns used as adjectives, participles, gerunds, and infinitives used as adjectives. Demonstratives, numericals, articles, and interrogatives were not counted as adjectives. The repeated use of the same adjective among consecutive words (e.g., "the old, old man") or among consecutive phrases (e.g., "the old man, the old woman, and the old dog") was counted as one occurrence of that adjective. This rule was implemented to prevent the students' overuse of a limited number of adjectives. A different adjective was one that had not previously

occurred in a given story-writing sample.

Story Quality. Story quality was evaluated by two advanced graduate students in psychology and in special education. Instructions given to the evaluators were:

> "Please judge each pair of writing samples on the basis of which sample is the more creative or expressive. Because of their handicaps, these children have received very little instruction in writing. Therefore, please do not use spelling, punctuation, or accuracy of grammar as criteria for judging the samples. A short statement on your rating criteria would be very useful."

Independent Measures. During all sessions the researcher checked off each step of the procedure on a seventeen-step procedural checklist. The steps included presentation of correct materials and instructions, recording of starting and stopping times, scoring and recording of students' work, descriptive praise, points earned, and delivery of back-up reinforcers.

Experimental Conditions.

Table 1 summarizes the experimental conditions, procedures, materials, and reinforcement contingencies in effect throughout the study. Each daily session consisted of a 15-minute tutoring period and a 20-minute story-writing period.

Insert Table 1 about here

Tutoring. During the 15-minute tutoring period, each student completed a worksheet on punctuation and capitalization (Baseline and Treatment 1), or sentence-combining (Treatments 2 and 3). Worksheets for capitalization/punctuation were scored for correct and incorrect use of specific target skills. Scoring procedures for sentence-combining exercises were developed by Schuster (1980). Briefly, if a student combined the sentences into an acceptable (grammatically correct) sentence, and placed the adjective(s) in the proper place(s), the sentence was considered correct.

Story writing. During the story-writing period of each session, the student selected one of two pictures about which to write. The student was told (a) to write a story about the picture, (b) that incorrect spelling would not count against him, and (c) that he had 20 minutes in which to write.

During Baseline, students experienced the tutoring and story-writing periods described above. Tutoring periods consisted of capitalization and punctuation exercises, and correct responding was reinforced with descriptive praise and points. During story-writing periods students were reinforced for correct use of capitalization and punctuation to ensure an equal amount of reinforcement across all experimental conditions.

During Treatment 1 students continued to work the punctuation/capitalization worksheets during the tutoring periods. During story-writing periods they were reinforced for use of adjectives. The purpose of this Treatment was to determine whether descriptive praise and points and simple instructions alone would

produce an increase in use of adjectives.

During Treatment 2, sentence-combining exercises to teach correct use of adjectives were introduced during the tutoring periods. The student earned descriptive praise and points for correctly combining sentences in which adjectives were appropriately placed. During the story-writing period the student continued to receive descriptive praise and points for use of adjectives.

During Treatment 3 tutoring periods, sentence-combining exercises were continued as in Treatment 2. During story-writing periods, however, descriptive praise and points were contingent upon use of different adjectives within the same story. This was used to try to further expand the students' repertoires of adjectives.

These three Treatment conditions were presented in a multiple-baseline design across three students. Following Baseline, Treatment 1 was presented to all three students. Following Treatment 1, Treatment 2 was presented to two students. The third Treatment condition was then presented to all three students.

Reliability

Interobserver agreement was calculated on a randomly-selected 25% of the daily-writing samples and procedural checklists per experimental condition per subject. Agreement was calculated separately on number of adjectives, number of different adjectives, number and length of T-units per sample, and the procedural checklist. In addition, interobserver agreement on story quality was calculated on 25% of the stories written in Baseline and all three Treatments combined for each child.

Agreement was computed by an item-by-item comparison of scores obtained by the researcher and a secondary observer. Data were calculated as a percentage of agreements by dividing the number of agreements by the number of agreements and disagreements and multiplying by 100 (Sulzer-Azaroff & Mayer, 1977).

Mean interobserver agreement for number of adjectives per T-unit was 96% (range = 50-100%), and for number of different adjectives per T-unit mean interobserver agreement was 97% (range = 93-100%). Interobserver agreement on T-unit length for three students in the four experimental conditions was 93% (range = 83-100%). Interobserver agreement for story quality was 94 percent of 18 pairs of stories evaluated. Interobserver agreement for the procedures checklist during all sessions was 100% (range = 98-100%).

Results

Number of Adjectives per T-unit

Changes in the number of adjectives per T-unit used by the three students are presented graphically in Figure 1. A six-cycle logarithmic scale was used to accommodate scores between .06 and 5.0 Solid lines through each experimental condition represent trends in the direction of data change, and broken lines through each Treatment condition represent projections of the Baseline trend (Kazdin, 1982).

During Baseline Chad, Andy, and Joe wrote a mean of .16, .36, and .29 adjectives per T-unit, respectively. With the introduction of Treatment 1 the number of adjectives per T-unit increased systematically for all three students to a mean of 1.14, 2.58, and 1.13 for Chad, Andy, and Joe, respectively.

Insert Figure 1 about here

When Treatment 2, the addition of sentence-combining exercises during tutoring, was introduced for Andy and Joe, no clear change in number of adjectives per t-unit was observed. Chad, who participated during fewer sessions, did not receive Treatment 2. Treatment 3, in which number of different adjectives was reinforced during story writing, was not associated with further change in mean number of adjectives written by the three students.

Number of Different Adjectives per T-unit

Changes in the number of different adjectives per T-unit obtained from the same story-writing samples are presented graphically in Figure 2. For all three students the number of different adjectives per T-unit increased systematically over the trends projected (shown with broken lines) from the Baseline condition with the introduction of Treatment 1 (simple instructions, descriptive praise, and points contingent upon use of adjectives). There was no further systematic increase in variety of adjectives following the introduction of Treatment 2 (sentence combining during tutoring) for Andy and Joe, or following Treatment 3 (descriptive praise and points contingent upon different adjectives) for any of the students. For all three students the variety of adjectives per T-unit continued to increase from the beginning of Treatment 1 to the end of Treatment 3. During the first five sessions of Baseline, Chad, Andy, and Joe wrote a mean of .15, .31, and .25 different adjectives per T-unit, respectively. By the

last five sessions of Treatment 3, Chad, Andy, and Joe wrote a mean of 1.04, 2.87, and 1.26 different adjectives per T-unit, respectively.

Insert Figure 2 about here

Mean Number of Words per T-unit

The mean number of words per T-unit (not presented graphically) showed gains for Chad and Andy, respectively, from pre-Baseline to the last five days of Treatment 3 of 2.56 and 3.34 words per T-unit. Based on Loban's (1976) descriptive research, these gains reflect increases of 4 grade levels for Chad and 5 grade levels for Andy. Joe's grade level did not change. Thus, at the end of the study, Chad, who had been 3 grade levels below the norm, was now 1 grade level above, and Andy, who had been 1 grade level below the norm, was now 4 grade levels above the norm. Joe's data showed little change from pre-Baseline to the end of Treatment 3.

Story Quality

The primary evaluator, on each of the 18 pairs of stories randomly-selected from Baseline and Treatment, judged the story written during Treatment to be better than the story written during Baseline. Following debriefing, the primary evaluator commented that in the better stories there was more background information and more sequencing of actions. Furthermore, she stated that the descriptions were better and that the child used literary devices such as, "One sunny day ..." to set the scene. Also following debriefing, both evaluators expressed surprise that the only skill taught was the use

of adjectives. The secondary evaluator was impressed with the differences in the stories and said in those he evaluated as "better" the writer was "clearly reaching for something beyond mere description."

Discussion

These findings are similar to those of Brigham et al. (1972) to the extent that improvement in the composition skills of academically deficient students was demonstrated as a function of reinforcement and simple instructions. In the present study descriptive praise, points, and simple instructions produced an increase in the number and variety of adjectives per T-unit per 20 minutes of free-writing time.

The Brigham et al. (1972) study showed effects on number and variety of words written by groups of students, but there was no measure of T-units, and the amount of time was free to vary. In fact, Brigham et al. (1972) demonstrated a systematic increase in the mean number of minutes in which groups of students were engaged in composition, rather than an increase in productivity within a constant writing period, as in the present study.

In the present study, increasing the number of adjectives per T-unit also increased the variety of adjectives per T-unit per story, perhaps because of the way in which points for adjectives were awarded. That is, the students were not reinforced for the repetitious use of the same adjective to increase points earned. This interpretation is further supported by the finding that there was no significant increase in number of different adjectives per T-unit following the introduction of Treatment 3, i.e., reinforcement for

different adjectives in a story

Central to the importance of the present study is the use of T-unit length and adjectives per T-unit as measures of change in syntactic complexity in writing. Although words or adjectives per sentence may be a more familiar measure, researchers do not agree on the definition of sentence, and, more importantly, handicapped students who have had little or no instruction in written language tend not to write in sentences, however defined. Thus, the T-unit was used in place of the sentence in the present research.

The T-unit is recommended for use in studies of written language for a variety of reasons. First, as previously noted, because T-unit lends itself to operational definition more readily than sentence (Hunt, 1965), it is a more exact measure.

Second, use of the T-unit measure obviates the need to rely on capitalization and punctuation supplied by the writer as indicators of sentence beginnings and endings. This is an important consideration in scoring compositions of less proficient or beginning writers, such as those in the present study.

Third, T-unit length, or words per T-unit, is a measure of syntactic complexity in that it depends on the use of particular kinds of words, phrases, clauses, and other syntactic structures to increase the amount of information it carries (Hunt, 1970). As Hunt (1965) points out, T-units can be expanded in two ways, (a) by increasing clause length and (b) by increasing the number of subordinate clauses.

There is one other behavioral anlaysis study in which T-units are used as a measure (Van Houten & MacLellan, 1981), but it is an

analysis of total words per T-unit written by normally-developing adolescents in two regular eleventh-grade English classes. The present is the first analysis of adjectives per T-unit, and it is the first study of T-units to be undertaken with handicapped students.

In descriptive studies of regular grade-school students Hunt (1970) found that changes in T-unit length normally increase with "glacial slowness" (p. 18) across grades--often by fewer than one word per T-unit. The results of the present study bear out Hunt's (1970) findings, but with handicapped children. Because changes in T-unit length with normal children are often less than one word per year (Hunt, 1970; Loban, 1976; O'Donnell, Griffin, & Norris, 1967; & Rousseau, 1982), the gains in the present study are impressive. The reinforcement and instructional Treatment package enabled handicapped children to progress in writing at the same rate as nonhandicapped children of equivalent grade levels. Furthermore, results of the present study demonstrated that handicapped children can, in fact, progress several grade levels within one academic year on at least one writing variable. That is, two out of three students (Chad and Andy) caught up to and surpassed their grade-level norms within one academic year. Whether similar results could be attained on other aspects of writing remains to be empirically determined.

Judgements of story quality and comments by independent evaluators suggest that increasing use of adjectives increased the meaningfulness of the compositions. That is, by including more information about the subjects and sequences of action, the treated compositions were more like stories, rather than loose sets of

descriptions. Although the students sometimes tended to overuse adjectives, as is common for children learning new writing skills (Weaver, 1979), apparently increasing adjectives also served to increase other, as yet unidentified aspects of writing skills. It remains to be experimentally determined whether simple instructions and reinforcement alone would produce similar results with more complex sentence structures, such as subordinate clauses.

In the present study the amount of reinforcement was held constant across experimental conditions. Therefore, it can be concluded that the contingency relationships between student behavior and the descriptive praise and point system, along with simple instructions, were responsible for the changes in written sentence complexity displayed by the students. Of course, it is possible that the simple instructions, "use describing words," alone could have accounted for the changes in student writing skills, but it seems more likely to have been the result of the instructions combined with reinforcement operations. A component analysis would be required to determine which aspects of the treatment package were most effective.

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Table 1.

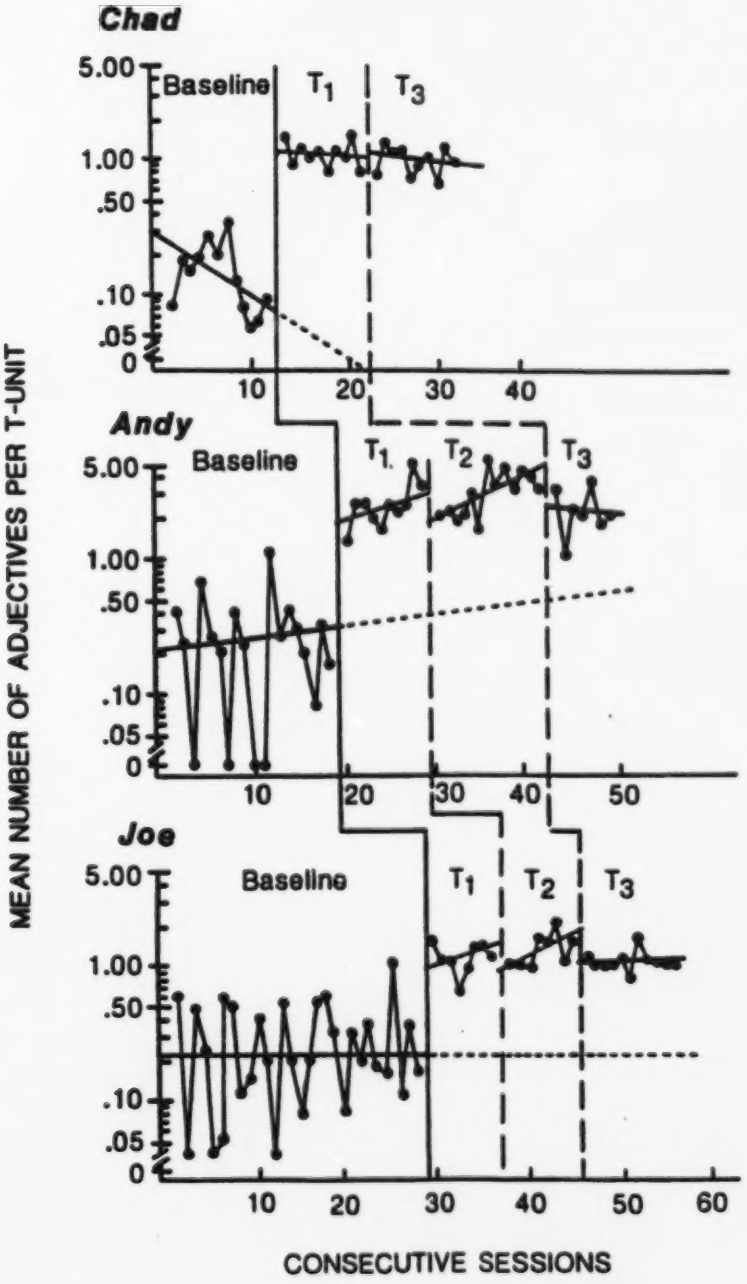
Experimental Conditions, Procedures, Instructions, and Reinforcement

Condition	Procedure	Instructions	Reinforcement For
Baseline	Tutoring		Cap. & Punct. Worksheet
	Story Writing:	"Use correct capitalization & punctuation"	Cap. & Punct. in Story
Treatment 1	Tutoring:		Cap. & Punct. Worksheet
	Story Writing:	"Use describing words"	Number of Adjectives in Story
Treatment 2	Tutoring:		Sentence-Combining Adjective Worksheet
	Story Writing:	"Use describing words"	Number of Adjectives in Story
Treatment 3	Tutoring:		Sentence-combining Adjective Worksheet
	Story Writing	"Use describing words"	Number of Different Adjectives in Story

Figure Captions

Figure 1. Mean number of adjectives per T-unit written by Chad, Andy, and Joe per consecutive 20-min story-writing period. Solid lines through each experimental condition represent trends in the direction of data change. Broken lines represent projections of the Baseline trend. During Baseline instructions were to use correct capitalization and punctuation, and correct use was reinforced. During Treatment 1 instructions were to use "describing words," and use of adjectives was reinforced. During Treatment 2 reinforcement for use of adjectives in stories continued following the sentence-combining Tutoring Periods. During Treatment 2 reinforcement was contingent upon the use of different adjectives.

Figure 2. Mean number of different adjectives per T-unit written by Chad, Andy, and Joe per consecutive 20-minute story-writing period. Solid lines through each experimental condition represent trends in the direction of data change. Broken lines represent projections of the Baseline trend. During Baseline instructions were to use correct capitalization and punctuation, and correct use was reinforced. During Treatment 1 instructions were to use "describing words", and use of adjectives was reinforced. During Treatment 2 use of adjectives continued to be reinforced following sentence-combining tutoring periods. During Treatment 3 reinforcement was contingent upon the use of different adjectives.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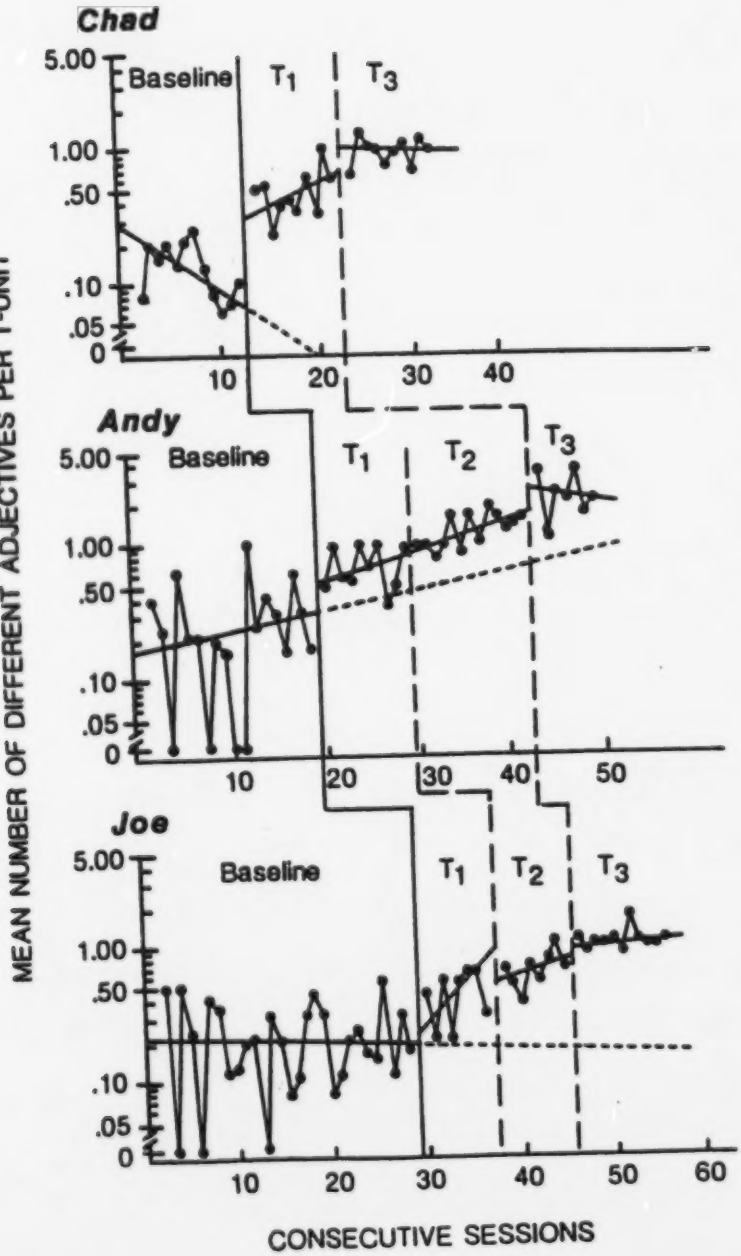
MEAN NUMBER OF ADJECTIVES PER T-UNIT
CONSECUTIVE SESSIONS

Figure 1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MEAN NUMBER OF DIFFERENT ADJECTIVES PER T-UNIT
CONSECUTIVE SESSIONS

Figure 2